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June 3, 1997

BY HAND DELIVERY

Mr. William F. Caton
Secretary
Federal Communications Commission
1919 M Street, N.W., Suite 222
Washington, D.C. 20554

Re: IB Docket No. 97-95, RM-8811

Dear Mr. Caton:

Attached for filing please find an original and nine copies of the Reply Comments of Hughes Communications, Inc. in the above-referenced rulemaking. Thank you.

Sincerely,

Arthur S. Landerholm*
of LATHAM & WATKINS

Enclosures

No. of Copies rec'd 0+9
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*Admitted in California only.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of:	
Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz, and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations	IB Docket No. 97-95 RM-8811

REPLY COMMENTS OF HUGHES COMMUNICATIONS, INC.

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June 3, 1997

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FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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REPLY COMMENTS OF HUGHES COMMUNICATIONS, INC.

Hughes Communications, Inc. ("HCI") submits these Reply Comments in response to the initial comments received by the Commission in its above-captioned Notice of Proposed Rulemaking (the "NPRM") relating to the 36 - 51.4 GHz band (the "40 GHz band").

INTRODUCTION AND SUMMARY

The initial Comments submitted by the satellite industry in this proceeding demonstrate consensus on the issues raised by the Commission's proposed plan for designating the use of the 15.4 GHz band of spectrum between 36.0 and 51.4 GHz. Without dissent, the satellite industry agrees that the Commission's proposal to designate only 2 GHz of spectrum in each direction for satellite use in the 40 GHz band will not sustain the wide range of BSS, MSS, and FSS services that will develop in the band given a sufficient designation of satellite

spectrum. Absent a larger designation of satellite spectrum, demand for these next-generation broadband satellite services will go unmet. The satellite industry also agrees that the Commission's proposal does not sufficiently appreciate or reflect the critical importance of global spectrum allocations to the satellite systems in development at 40 GHz.

As a result of these important unresolved issues, the satellite industry urges the Commission to follow through on its commendable intention to comprehensively plan the future use of the 40 GHz band and, therefore, to refrain from acting on *any* aspect of the proposed band plan until the significant contingencies affecting the assumptions underlying the Commission's proposal have been resolved. Thus, the satellite industry agrees that the Commission should wait to designate *any* 40 GHz spectrum in this proceeding, or in any related proceeding, until after (i) the results of WRC-97 can be assessed and (ii) the upcoming 40 GHz satellite filing window has been concluded. Only then can the Commission adequately gauge the demand for satellite-system spectrum at 40 GHz.

Yet, while the satellite-industry comments put forth a strong and unified argument for the need to maintain significant satellite spectrum across the entire 40 GHz band, the terrestrial industry was virtually silent as to its need, or even its desire, for terrestrial spectrum designations outside of the 38.6 - 40.0 GHz band. In addition, while several of the terrestrial commenters made reference to the number of U.S. terrestrial licenses in the 38.6 - 40.0 GHz band, no terrestrial commenter put forth any specific assertion detailing the extent of on-the-ground implementation of its system. Indeed, nothing in the terrestrial-industry comments justifies the Commission's proposed designation of 6.6 GHz of 40 GHz spectrum for terrestrial systems.

HCI submits, attached as Appendix A, its proposed band plan as an alternative to the Commission's proposal and to other proposals submitted with the initial comments. HCI believes that the satellite industry -- consisting of the FSS, BSS, and MSS services -- needs a minimum of 4 GHz of spectrum in each direction in the 40 GHz band to ensure the viability of, and satisfy the global demand for, future satellite communications systems. Yet, while the amount of spectrum required for satellite systems at 40 GHz is clear, HCI believes that the Commission should not attempt to divide this satellite spectrum among the three satellite services until the Commission has the benefit of the information contained in the applications that will be submitted in response to the impending 40 GHz satellite filing window. The Commission and the industry need this information to gauge the needs of each satellite service, as well as the ability of systems in the same and different services to share spectrum on a co-frequency basis.

Any segmentation of satellite designations at 40 GHz between GSO and NGSO systems is also premature. Sharing between GSO and NGSO systems at 40 GHz should not be foreclosed at this time. In fact, because 40 GHz systems are at an early developmental stage, there is no reason why technologically practical 40 GHz NGSO systems cannot both (i) share spectrum with 40 GHz GSO systems, and (ii) support a viable business case. Perhaps more importantly, because the Commission has not yet opened a 40 GHz satellite filing window, the Commission does not have sufficient information regarding whether or in what way to segment the 40 GHz satellite spectrum among GSO and NGSO systems.

HCI does support the designation of separate spectrum for satellite and terrestrial services at 40 GHz. And while HCI has no objections to secondary operations in the 40 GHz

band, no party endorsed the Commission's "underlay" proposal. Thus, the "underlay" proposal should not be adopted.

Given the number of important issues that must be determined before the Commission can move forward with a rational blueprint for the 40 GHz band, and given the complexity of implementing a comprehensive band plan, the Commission must not proceed in a piecemeal fashion to designate portions of the 40 GHz band before all material contingencies affecting the overall band plan have been resolved. As such, the Commission should not move forward with this proceeding, or any other proceeding relating to the 40 GHz band, until after WRC-97 and until after the Commission has reviewed the results of the impending satellite filing window. Finally, in order to permit the Commission to rationalize the use of the 40 GHz band, the Commission should not issue additional terrestrial licenses in the 39.5 - 40.0 GHz sub-band pending the resolution of this proceeding.

I. CLEAR CONSENSUS EXISTS AMONG THE SATELLITE INDUSTRY THAT THE COMMISSION'S CURRENT PROPOSAL IS INADEQUATE

The initial Comments submitted by the satellite industry[1] in this proceeding demonstrate broad agreement on most of the important issues raised by the Commission's NPRM. There is a consensus among the satellite industry that a designation of only 2 GHz in each direction for satellite systems in the 40 GHz band is insufficient to permit, much less encourage, the development of the full range of FSS, MSS, and BSS systems in that band. The satellite industry also agrees that global spectrum allocations are critical for future satellite

[1] The following satellite interests submitted comments in this proceeding: HCI; Lockheed Martin Corporation ("Lockheed"); TRW, Inc. ("TRW"); GE American Communications, Inc. ("GE"); Motorola Satellite Systems, Inc. ("Motorola"); Teledesic Corporation ("Teledesic"); the Satellite Industry Association ("SIA"); and SkyBridge L.L.C. ("SkyBridge").

systems and that the Commission's proposed band plan does not sufficiently address the need for global spectrum allocations. In addition, the satellite industry urges the Commission to approach the implementation of a 40 GHz band plan in a comprehensive, rather than piecemeal, fashion and to refrain from acting on *any* aspect of the band plan until after the results of WRC-97 can be assessed. Finally, the satellite industry agrees that the Commission should wait to designate any 40 GHz spectrum for a particular use until after the upcoming satellite filing window, when the Commission can adequately gauge the demand for satellite-system spectrum at 40 GHz.

A. The Satellite Industry Agrees That 2 GHz of Satellite Spectrum in Each Direction at 40 GHz is Woefully Insufficient

The initial comments make it quite clear that HCI and the other satellite-industry commenters are looking to the 40 GHz band to provide the expansion spectrum that is necessary to support the new broadband satellite communications systems they have in development. As HCI discussed at length in its initial comments, strong consumer and industry demand will exist imminently for broadband communications capacity to be provided by the next generation of satellite systems that will encompass each of the BSS, MSS, and FSS services.[2] Motorola, Lockheed, GE, TRW, and the SIA each echoed HCI's view of this expanding demand for broadband satellite communications.[3] The satellite industry believes that significant spectrum at 40 GHz is essential to serve this widely-expected surge in demand. As HCI, Motorola, and GE stated, there is substantial congestion in the existing satellite allocations in the C and Ku bands and there is an expectation of robust demand for the services to be provided by Ka band

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2 *See* HCI Comments at 5-7.

3 GE Comments at 5; Motorola Comments at 8; SIA Comments at 2; *see* Lockheed Comments at 16 (BSS demand); TRW Comments at 10 (BSS demand).

systems.[4] In addition, as noted by GE, rain and oxygen attenuation effects for satellite systems worsen substantially above 50 GHz.[5] Thus, the 40 GHz band is the "last frontier" for satellite communications for the foreseeable future. Indeed, in designating 2 GHz of spectrum in each direction for FSS at 40 GHz, the Commission has also implicitly recognized the satellite industry's need to expand commercial satellite operations into the 40 GHz band.

However, the Commission's proposal does not adequately take into account the satellite industry's designs for the 40 GHz band and significantly understates the future need for satellite spectrum at 40 GHz. The satellite industry questions the Commission's decision to look only to Motorola's pending M-Star application when considering the demand for satellite spectrum at 40 GHz.[6] As HCI and other commenters explained in the initial comments, the long lead-times necessary to develop and deploy satellite systems should not lead the Commission to labor under the mistaken impression that the satellite industry has few plans for the 40 GHz band.[7] HCI concurs with Lockheed's argument that while the portions of the 40 GHz band allocated to satellite services may appear vacant today, this appearance bears no relationship to the satellite industry's current, aggressive research and development efforts for the future commercial use of the band.[8] As the majority of the satellite industry commenters asserted, the Commission cannot adequately or even *rationally* gauge the demand for future satellite systems

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4 *See* GE Comments at 1-2; HCI Comments at 11; Motorola Comments at 8 (C, Ku, Ka, L and S bands).

5 *See* GE Comments at 4-5.

6 *See* Lockheed Comments at 11-12; TRW Comments at 14; *cf.* Motorola Comments at 6.

7 *See* HCI Comments at 9; Lockheed Comments at 11-12; TRW Comments at 14.

8 *See* Lockheed Comments at 11; *see also* TRW Comments at 14.

in this band until it has opened a filing window and has reviewed the applications for 40 GHz satellite systems that will be filed in response.[9]

Judging by the satellite-industry comments, the impending filing window will likely yield 40 GHz satellite proposals that significantly exceed the capacity represented by the Commission's proposed designation of 2 GHz of satellite spectrum in each direction. The satellite industry is nearly unanimous in the view that the Commission's proposal to designate only 2 GHz in each direction for satellite use would severely impair the viability of future broadband satellite systems at 40 GHz, and, in doing so, would leave the future demand for these systems unsatisfied.[10] HCI firmly believes that the future demand for broadband satellite communications cannot be met within the financial and technical constraints imposed by a designation of only 2 GHz of spectrum in each direction for use by all satellite services. Nearly all of the other satellite-industry comments strongly support this view.[11] As HCI's alternative band plan attached as Appendix A demonstrates, HCI believes that the Commission must designate a minimum of 4 GHz of spectrum in each direction for satellite use.

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[9] Lockheed Comments at 11-12; Motorola Comments at 13; TRW Comments at 14-15.

[10] GE Comments at 3; Lockheed Comments at 3; Motorola Comments at 5, 7; SIA Comments at 2; TRW Comments at 3.

[11] Motorola argued that it needs a minimum of 3 GHz of contiguous bandwidth in each direction to accommodate its proposed M-Star system and other FSS systems. Motorola Comments at 5. GE asserted that 4 GHz of contiguous bandwidth in each direction is needed to accommodate all satellite services and interests in the 40 GHz band. GE Comments at 5. TRW urged the Commission to preserve those portions of the international allocations that remain viable for global implementation. TRW Comments at 3-4.

B. The Satellite Industry Agrees That the Commission's Proposal Does Not Adequately Address the Need to Maintain Global Satellite Allocations

There is again a strong consensus among the satellite industry that the Commission, in designating spectrum for FSS use, did not give sufficient weight to the need to maintain existing global satellite spectrum allocations. Nearly all of the satellite-industry commenters trumpeted the critical importance of global spectrum allocations to the viability of future 40 GHz satellite systems. Lockheed and TRW correctly indicated that NGSO systems would be virtually foreclosed without global frequency allocations.[12] Lockheed also noted the importance of global allocations to GSO systems because global allocations allow deployment of standard satellites that provide the capability to restore lost capacity and reconfigure the service area in orbit.[13] GE argued that global satellite allocations are "essential to permit integrated satellite systems."[14] HCI supports these positions and reiterates its own initial comments regarding the importance of global allocations to satellite system viability. Global allocations allow satellite systems to fully exploit their intrinsic spectrum efficiency and are vital to the economic viability of satellite systems, both GSO and NGSO, that provide worldwide coverage.

C. The Satellite Industry Agrees that the Commission Should Wait For the Results of WRC-97 Before It Takes Further Action

Nearly every satellite interest argued that the Commission should not move forward with its proposed band plan, or any other pending proceeding that relates to the 40 GHz band, until the completion of WRC-97. As TRW argued:

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[12] Lockheed Comments at 9; TRW Comments at 7.

[13] Lockheed Comments at 9.

[14] GE Comments at 10.

> [The] Commission must not proceed with any part of its proposal without first making sure that the entire package it ultimately decides to embrace will be accomplished internationally. Any other course of action will prejudice the interests of the services that [, as a result of the Commission's proposal, must] rely on international allocation changes [to ensure the global reach of their systems.][15]

Lockheed, GE, Motorola, and SIA each firmly support this position.[16] HCI agrees that by proposing to dismantle existing global satellite allocations in the hope of obtaining new satellite allocations at WRC-97, the Commission is putting the *entire* risk of this proceeding on an industry that has relied on, and in fact has based its future plans on, continued access to the existing global satellite allocations that have been in place for almost 20 years. Proceeding forward with the Commission's proposed terrestrial wireless designations in the 40 GHz band prior to the conclusion of WRC-97 would unfairly and arbitrarily prejudice the satellite industry because there can be no assurance at this time that the dismantled global satellite allocation can be reconstructed.

D. The Satellite Industry Agrees that the Commission Should Wait to Designate Spectrum Until After the Close of the 40 GHz Satellite Filing Window

The satellite industry agrees that the Commission should wait until after the close of the impending 40 GHz satellite filing window before designating spectrum for any part of the 40 GHz band. As TRW argued, the Commission cannot rationally evaluate the demand by satellite companies for spectrum at 40 GHz on the basis of the one application now pending with the Commission.[17] Lockheed noted correctly that the Commission "is lacking critical

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[15] TRW Comments at 16-17.

[16] *See* GE Comments at 11; Lockheed Comments at 14; Motorola Comments at 12-13; SIA Comments at 2.

[17] TRW Comments at 14.

information concerning the range of [satellite] system proposals that [the 40 GHz band] will support."[18] And even Motorola, the one pending 40 GHz satellite applicant, agreed that the Commission cannot make "reasoned assessments" of the need for 40 GHz satellite spectrum absent additional satellite proposals for the band.[19] HCI supports these arguments and urges the Commission to refrain from designating or reallocating spectrum in any part of the 40 GHz band until the Commission holds the long-promised 40 GHz satellite filing window and fully integrates the details of the proposals filed there into these proceedings. In addition, as TRW correctly suggested,[20] the brief pause in proceedings that the Commission should institute to allow for the resolution of WRC-97 would also provide the Commission an opportunity to consider the applications filed in the filing window in the next few months.

HCI also wishes to firmly support a point raised by both TRW and Lockheed with respect to the filing window.[21] The Commission's NPRM implies that the Commission might require satellite applications submitted in response to the impending filing window to conform to the FSS frequency designations presented by the Commission's *proposed* 40 GHz band plan.[22] Requiring applications in the upcoming filing window to conform to the Commission's proposed band plan would arbitrarily limit the filing of relevant information regarding the potential services and satellite systems in the 40 GHz band and would require satellite applications to seek

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[18] Lockheed Comments at 11; *see also* TRW Comments at 11.

[19] Motorola Comments at 13.

[20] TRW Comments at 5.

[21] *See* Lockheed Comments at 12, n. 13; TRW Comments at 15, n. 9.

[22] NPRM at ¶ 22.

access to spectrum that is not currently available internationally for FSS services. Furthermore, the Commission's proposal is just that, a proposal. And as the satellite-industry comments confirm, the Commission's proposal has significant flaws. Therefore, satellite applications in the impending filing window should not be required to conform to the Commission's proposed band plan. Instead, the Commission should apply the same policy it did in the 28 GHz proceeding:[23] the Commission should not impose any limits on the bands for which satellite applicants may seek a license and should allow the applications filed in the filing window to be amended as needed after the completion of WRC-97 and after the Commission releases a Report and Order in this proceeding.

II. THE TERRESTRIAL INDUSTRY HAS DEMONSTRATED VIRTUALLY NO NEED FOR SPECTRUM ABOVE 40.0 GHZ

While the satellite-industry comments put forth a strong and unified argument for the need to maintain significant satellite spectrum across the entire 40 GHz band, the terrestrial industry[24] was virtually silent as to its need, or even its desire, for terrestrial spectrum designations outside of the 38.6 - 40.0 GHz band. WinStar limited its comments entirely to the 38. 6 - 40.0 GHz band. Similarly, ART's comments are devoid of any discussion of the need for terrestrial spectrum except for the 38.6 - 40.0 GHz band. Even the most extensive of the terrestrial comments, those of the Terrestrial TIA, do not provide any discussion of the need for

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[23] *See Ka-Band Satellite Applications Accepted For Filing: Cut-Off Established for Additional* Applications, Report No. SPB-20, DA 95-1689 (rel. July 28, 1995).

[24] The following terrestrial interests submitted comments in this proceeding: The Fixed Point-to-Point Communications Section, Network Equipment Division, of the Telecommunications Industry Association ("Terrestrial TIA"), Advanced Radio Telecom Corp. ("ART"), WinStar Communications, Inc. ("WinStar"), Alcatel Network Systems, Inc. ("Alcatel"), and ICE-G, Inc. ("ICE").

the spectrum above 40.0 GHz. In fact, the Terrestrial TIA described the spectrum *above 50 GHz* as "the next growth area for the FS"[25] and noted that the 50 GHz and 58 GHz bands have been used by terrestrial users in the United Kingdom for several years.[26] Sky Station International, Inc. ("Sky Station"), which has the only pending terrestrial application for spectrum between 47.2 - 48.2 GHz,[27] did not file comments. Only ICE argued for terrestrial designations above 40.0 GHz and ICE's comments maintain only that the Commission should reallocate the 40.5 - 42.5 GHz BSS band for terrestrial use.[28] ICE's comments are silent as to the need for terrestrial spectrum below 40.5 GHz and above 42.5 GHz.

Furthermore, while the Terrestrial TIA and other terrestrial commenters made reference to the number of U.S. licenses in the 38.6 - 40.0 GHz band, noticeably absent from any of the terrestrial-industry comments is any specific assertion detailing the extent of on-the-ground implementation or existing non-experimental usage of their systems. This information is critical for understanding the cost-benefit analysis of potentially modifying existing FCC terrestrial licenses as part of an overall rationalization of the 40 GHz band.

While the terrestrial interests have not presented any case for designating spectrum for terrestrial services below 38.6 GHz or between 39.5 and 50.2 GHz, HCI recognizes and appreciates the Terrestrial TIA's attempt to move toward a compromise band plan. The

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[25] Terrestrial TIA Comments at 7.

[26] *Id.* at 8, n. 11.

[27] *See* Application of Sky Station International, Inc. for Authority to Construct, Deploy and Operate a Global Stratospheric Telecommunications System, File No. 96-SAT-P/LA-96 (filed March 20, 1996).

[28] ICE Comments at 3.

Terrestrial TIA's plan represents a step in the right direction. For example, HCI agrees with the Terrestrial TIA that access to contiguous bandwidth for both terrestrial and satellite systems is preferable and beneficial.[29] Further, in light of the compelling need for global satellite spectrum allocations, HCI agrees in principle with the Terrestrial TIA's argument to harmonize internationally the actions the Commission takes in this proceeding.

Yet, despite these areas of agreement and the Terrestrial TIA's obvious good faith effort, the Terrestrial TIA's proposal shares many of the issues that exist with the Commission's proposal and ultimately does not meet even the minimum needs of the satellite industry. In retaining the Commission's designation of 2 GHz in each direction, the Terrestrial TIA proposal, like the Commission's proposal, does not designate sufficient spectrum to accommodate all forthcoming satellite service proposals at 40 GHz. The Terrestrial TIA plan makes no provision for MSS. In addition, Terrestrial TIA equates the present absence of BSS deployment at 40.5 - 42.5 GHz with the absence of demand for BSS use of this spectrum.[30] Of course, by this rationale and based upon the information in the terrestrial-industry comments, there should be no terrestrial designation in *any* part of the spectrum above 39.5 GHz.

As a result, HCI disagrees with the Terrestrial TIA's suggestion to leave the 40.0 - 40.5 GHz and the 47.5 - 47.9 GHz bands "open" for future terrestrial or satellite use.[31] The Commission should designate these bands in the current proceeding and should designate them

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[29] The present proposal to segment the 47.2 - 50.2 GHz satellite uplink band would foreclose satellite use all or part of the 47.2 - 48.2 GHz band and is inconsistent with the agreed-to need for contiguous spectrum.

[30] *See* Terrestrial TIA Comments at 17.

[31] *See* Id. at 22, Appendix A.

for satellite use. Further, the Commission should designate 39.5 - 40.0 GHz for satellite use. While the Terrestrial TIA asserted in its comments that there are substantial European terrestrial deployments in the 37.0 - 40.5 GHz band,[32] in informal post-NPRM discussions with the satellite industry, certain terrestrial interests asserted that these European deployments are limited to the 37.0 - 39.5 GHz band. Ultimately, no party has submitted concrete or substantiated figures regarding terrestrial deployment in Europe or elsewhere in the 39.5 - 40.5 GHz band. As such, the Commission should move forward to designate spectrum upon the documented needs of the satellite industry for a much larger block of 40 GHz spectrum than the Commission has proposed to meet the needs of the next generation of BSS, MSS, and FSS satellite systems.

III. THE HCI ALTERNATIVE BAND PLAN

Attached as Appendix A is a graphical representation of the band plan that HCI submits as an alternative to the Commission's proposed band plan and to the Terrestrial TIA's proposal. As a threshold matter, HCI believes that the satellite industry -- consisting of the FSS, BSS, and MSS services -- needs a minimum of 4 GHz of spectrum in each direction in the 40 GHz band to satisfy the global demand for future satellite communications systems.

While the amount of spectrum required for satellite systems at 40 GHz is clear, the Commission should not attempt to divide this satellite spectrum among the three satellite services until the Commission has the benefit of the information contained in the applications submitted in response to the impending 40 GHz satellite filing window. That information will allow the Commission and industry to gauge the needs of each satellite service, as well as the

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[32] *Id.* at 7.

ability of systems in the same and different services to share spectrum on a co-frequency basis.[33] Therefore, HCI's alternative band plan does not divide satellite spectrum among the satellite services.[34] However, HCI elaborates its views regarding satellite sub-bands in the discussion below.

HCI proposes to designate the 37.5 - 38.5 GHz band for satellite use. This designation is consistent with the existing international allocation for this band. Motorola also supports preserving this sub-band for satellite use.[35] Because of the rain and oxygen absorption levels characteristic of the 40 GHz band and the engineering challenges that are attendant to these attenuation attributes, some satellite systems proposed for operation at 40 GHz may need to utilize downlink spectrum below 39.5 GHz to be viable. Therefore, the Commission's blueprint for satellite use of the 40 GHz band should include access to at least some spectrum in the lower portion of the band.

HCI also proposes to designate the 39.5 - 40.5 GHz band for satellite use, which is consistent with the existing global allocations for this band. Again, Motorola also supports preserving this sub-band for satellite use.[36] In light of the compelling need for global satellite

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[33] HCI is still exploring the relative 40 GHz spectrum requirements of the three satellite services, as well as the potential for co-frequency sharing among the three services. These issues must be explored further before any segmentation decision is appropriate. HCI believes that it is too early to conclude, for example, as Motorola has suggested, Motorola Comments at 9, n. 12, that MSS and FSS systems cannot share spectrum.

[34] As the HCI alternative band plan addresses only a proposed designation of the band among primary users (satellite or terrestrial wireless), it does not address possible secondary uses.

[35] *See* Motorola Comments at 6; *cf.* TRW Comments at 3-4.

[36] Motorola Comments at 9; *cf.* TRW Comments at 3-4.

spectrum, the Commission should take the Terrestrial TIA's suggestion to leave the 40.0 - 40.5 GHz band open for future satellite or terrestrial use one step further and designate that sub-band for satellite use. In addition, as a practical matter, HCI believes that the 39.5 - 40.0 GHz band remains available for global satellite implementation because the current High Density Fixed Service deployment in Europe is reported to extend only up to 39.5 GHz. Further, the terrestrial industry has yet to demonstrate that the deployment of the fixed service in the 39.5 - 40.0 GHz band in the U.S. has developed in a manner that would prevent relocation to an alternate sub-band. Therefore, the Commission should designate the 39.5 - 40.5 GHz band for the next generation of satellite systems. HCI believes this band segment would be utilized by MSS and/or FSS systems, which is in both cases consistent with current international and domestic allocations.

HCI agrees with Lockheed[37] (and indeed the Terrestrial TIA)[38] that the 40.5 - 42.5 GHz band should be designated solely for satellite use. This band does not currently contain a primary fixed terrestrial allocation and as such presents a worldwide satellite allocation that is unencumbered by the sharing difficulties that fixed terrestrial industry has so vociferously sought to avoid. As such, the Commission should reject the suggestion by ICE that the Commission accommodate terrestrial systems at 40.5 - 42.5 GHz. Indeed, ICE has completely failed to explain why the 40.5 - 42.5 GHz band is preferable to the existing terrestrial allocations below 39.5 GHz.

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[37] Lockheed Comments at 15.

[38] *See* Terrestrial TIA Comments at Appendix A (proposed band plan).

Subject to the results of the upcoming satellite filing window, HCI tentatively proposes to retain the BSS allocation at 40.5 - 42.5 GHz, but would support Motorola's suggestion[39] to seek an additional, global FSS allocation across this band at WRC-97. Among other things, doing so would restore a contiguous 3 GHz global FSS allocation at 39.5 - 42.5 GHz that the Commission's current proposal would dismantle at 37.5 - 40.5 GHz. In addition, as TRW suggests, removing the BSS allocation in this band may prove unpopular with developing nations,[40] and, more importantly, HCI believes it is important to retain the possibility of BSS service in this band. While Motorola suggests that a co-primary FSS and MSS allocation might be appropriate for the 40.5 - 41.5 GHz band,[41] HCI notes that MSS service from this band would require both domestic and international allocations changes; therefore, the existing 39.5 - 40.5 GHz allocation is a preferable location for MSS service due to existing allocations there.

HCI proposes that the designate 1.0 GHz of the 45.5 - 46.7 GHz band for satellite use. The band is currently allocated domestically for MSS uplinks. The Commission's NPRM indicates that government users may have interest in this band for MSS, Mobile Service (secondary), and/or Radionavigation Satellite Service systems.[42] Without further information regarding the characteristics of these proposed or future systems, HCI cannot fully address any sharing or interference issues with these government systems, or whether government users in this sub-band should have co-primary or secondary status.

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[39] Motorola Comments at 9.

[40] TRW Comments at 10.

[41] Motorola Comments at 9, n. 12.

[42] *See* NPRM at Appendix C (Current and Proposed Government Uses chart).

HCI shares the view expressed in nearly all of the satellite-industry comments regarding the 3 GHz spectrum band between 47.2 and 50.2 GHz. That entire, contiguous 3 GHz segment must remain allocated to and available for satellite use. HCI strongly supports the views of TRW and Motorola that the Sky Station system is most appropriately accommodated above 50.2 GHz.[43] Furthermore, with the exception of the Sky Station application, there appears to be no terrestrial interest in this band.[44] HCI expects that the band would accommodate FSS services, including "feeder links" to BSS systems.

IV. GSO/NGSO SEGMENTATION IS PREMATURE

HCI reiterates its initial comments that any segmentation of satellite designations at 40 GHz between GSO and NGSO systems is premature at this time. Lockheed shares the same view.[45] However, Teledesic and Motorola endorse the Commission's plan to designate separate GSO and NGSO bands. Motorola argues that co-frequency sharing between GSO and NGSO systems could significantly limit the capacity of its NGSO system.[46] Teledesic argues generally that the degree of interference caused by co-operating GSO and NGSO systems augers for segmentation of the systems.[47] HCI disagrees with the unsupported assessments of Teledesic and Motorola.

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[43] *See* Motorola Comments at 9; TRW Comments at 10-11, n. 6.

[44] *See* discussion in Section II, *supra*.

[45] Lockheed Comments at 13, n. 15.

[46] Motorola Comments at 8.

[47] Teledesic Comments at 2.

HCI has long advocated the development of sharing criteria that would facilitate equal access to the spectrum by both GSO and NGSO satellite systems. Indeed, Motorola, in its M-Star application, argued that its proposed system could share with GSO systems and that such sharing would actually be easier to accomplish than sharing among NGSO systems.[48] NGSO systems are uniquely suited to resolve the potential for interference with the GSO arc. SkyBridge echoed this position, when it argued compellingly that "the capability of a given NGSO system to share spectrum with a GSO system is largely a function of the NGSO system's architecture.[49] Further, at the recent ITU Conference Preparatory Meeting for WRC-97, many administrations agreed that mitigation of interference between NGSO and GSO systems is possible using satellite diversity, and that technique has significantly less impact on the NGSO system if the sharing criteria are considered during initial network design. Also, Intelsat presented simulation results demonstrating that satellite diversity applied to a LEO-type system would allow frequency sharing even in the presence of a large number of GSO systems.[50]

As long as sharing technology is taken into account at the early design stage of an NGSO system, there is no reason why technologically practical NGSO systems cannot both (i) share spectrum with GSO systems, and (ii) support a viable business case. While it was expedient a few years ago to segment the 28 GHz band among GSO and NGSO systems to avoid a prolonged process late in that proceeding, it is not clear at this stage whether there is a

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[48] M-Star Application at 69-70.

[49] SkyBridge Comments at 3.

[50] *See* Intelsat, *Interference to a Non-GSO FSS Network From Multiple GSO FSS Networks*, Document CPM 97/78-E, April 23, 1997.

compelling reason to do so again at 40 GHz. At this early stage of developing 40 GHz satellite systems, every 40 GHz satellite system proponent has sufficient lead time and flexibility to incorporate GSO sharing criteria into any NGSO system it may propose.

Perhaps more importantly, because the Commission has not yet opened or completed a 40 GHz satellite filing window, the Commission does not have sufficient information regarding whether or in what way to segment the 40 GHz satellite spectrum among GSO and NGSO systems. The filing window may produce GSO and NGSO proposals that are co-frequency compatible. Even if the system proposals reveal that GSO/NGSO segmentation is necessary, the number of GSO or NGSO proposals submitted in the filing window may auger for a division of satellite spectrum other than the 50/50 split the Commission has proposed.

V. TERRESTRIAL SHARING AND THE "UNDERLAY" PROPOSAL

Based upon the evidence currently available, which suggests that co-frequency operation by the types of satellite and terrestrial systems likely to develop at 40 GHz is not feasible, the Commission should designate separate spectrum for the satellite and terrestrial services at 40 GHz.[51] The Commission should not, however, foreclose secondary operation in these bands. To that end, HCI disagrees with the suggestion by ART[52] that satellite operation on

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[51] While HCI does not disagree with the comments of, *inter alia*, TRW and Lockheed, TRW Comments at 15-16; *see* Lockheed Comments at 13, that the Commission should not foreclose the possibility of future sharing between satellite and terrestrial users, no commenter has presented a plan for such sharing that would warrant any course of action other than segmentation of the 40 GHz band at this time. Of course, the Commission may certainly revisit this issue at a later date should technological developments alter the present calculus. Furthermore, the Commission should continue to encourage the development of sharing opportunities between satellite and terrestrial services.

[52] ART Comments at 9-10.

a secondary basis should require the prior consent of the terrestrial user who has the primary allocation. ART does not point to a single instance where the Commission has required a secondary user to obtain the prior consent of every primary user in the band. Indeed, it cannot, because such a requirement would undercut the very concept of secondary operations. HCI has no issue with retaining the Commission's long-established policy to authorize secondary operations only after an adequate demonstration has been made that the primary users will not experience harmful interference. As long as the Commission retains such a requirement, the operations of primary users will be fully protected by the Commission's processes.

HCI views the Commission's "underlay" proposal with the same concern and confusion expressed by nearly every commenter that addressed the issue. There is no support in either the terrestrial-industry or satellite-industry comments for the Commission's "underlay" proposal and, indeed, many commenters noted that the parameters of that proposal are unclear and present significant, unresolved regulatory issues.[53] While HCI has no objections to secondary allocations in these bands, and mutually agreeable commercial arrangements between satellite and terrestrial users should not be foreclosed, there is no basis for adopting the Commission's "underlay" proposal on the current record.

VI. THE COMMISSION SHOULD TAKE NO INTERIM ACTIONS THAT WOULD FORECLOSE A UNIFIED RESOLUTION OF THE 40 GHz BAND

As the initial comments and the above discussion illustrate, there are a number of important issues that the Commission must resolve in this proceeding before it can implement a rational blueprint for the 40 GHz band. The results of WRC-97 and the impending satellite filing

[53] *See, e.g.,* TRW Comments at 19.

window are likely to significantly alter the landscape in which the Commission acts. HCI also reiterates the view expressed in its initial comments: that the Commission must have a full and accurate picture of the government demands for spectrum at 40 GHz, and the government's ability to share in the commercial parts of the band, before implementing *any* part of the proposed band plan.[54] Without such an understanding, the Commission cannot fairly or justly accommodate the needs of the satellite and terrestrial interests in the 40 GHz band.[55]

Proceeding in a piecemeal fashion prior to the resolution of these issues would impose arbitrary prejudice upon the satellite industry by altering the equities among the parties with a stake in the 40 GHz band and by "cementing" the disposition of portions of the 40 GHz band before all of the other segments can be resolved rationally. By moving forward in this proceeding or in any other proceeding with portions of the 40 GHz band before all material contingencies are removed, the Commission runs the risk that its ultimate resolution of the 40 GHz band will arbitrarily depart from the public interest. Thus, HCI agrees with the rest of the satellite industry[56] that the Commission should not move forward with this proceeding or any

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[54] HCI Comments at 15-16.

[55] HCI supports Motorola's suggestion that the Commission encourage greater commercial use of the spectrum bands allocated for government use. Motorola Comments at 10. The Commission should encourage government users to cede spectrum to commercial licensees in exchange for "protected" status on commercial satellite systems. However, despite HCI's support for these concepts, because of the unlikely prospect that they will be implemented in the near term, these concepts do not reduce in any way the minimum requirements for satellite spectrum at 40 GHz. Indeed, as HCI noted in its initial comments, government use of the 40 GHz band represents more of a threat than an opportunity with respect to commercial satellite use of the band.

[56] *See* TRW Comments at 14, 16-17; GE Comments at 11; Lockheed Comments at 11, 14; Motorola Comments at 12-13; SIA Comments at 2.